

GILSONITE

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Tape #236

Transcribed by Marilyn Hunting January 2001

Bud speaking at the Golden Age Center to the Historical Society June 10, 1995

For those of you that don't know me, I'm Robert P. Covington, consulting geologist and officer of Hiko Bell Mining and Oil. I also do consulting work in Craig, Colorado. I'm going to speak today on the economic minerals of the Uintah Basin. What their significance is to this area, including some of the historical background. So we have to ask ourselves what minerals are there and what effect do they have on our area today. Some of the minerals that are important to us are, gilsonite, phosphate, coal, oil shale, bituminous tar sands, copper, silver and lead deposits, gold, sand, gravel and flagstone, nothing can hide, we have iron, bi-lithium, and uranium.

The first one I want to talk about a little is gilsonite. I've done quite a bit of work for both the American Gilsonite Company and for Zeigler Chemical Company. We have three companies today who are functional, operating mines in the Uintah Basin. American Gilsonite, Zeigler Chemical Company and Lexco. They are today, mining and operating as a gilsonite mining companies. So we say, what is gilsonite? Gilsonite is a soft hydro-carbon, classified in scientific literature as an asphalt-typing; meaning it is a member of the asphalt family.

So we say what significance does it have for us in the Basin? It has been a producer for years of many jobs, many millions of tons have been mined. So let's talk a little about the story of gilsonite and what it is. It is brittle, black, lustrous, it is a hydro-carbon, often mistaken for coal. It melts instead of burning, in the early days there were tragedies; to heat with it like they do coal

in their stoves it would melt and ruin their grates. It was named after Samuel Gilson. Gilson probably didn't discover it but he was responsible for its early development.

Sam Gilson, for whom it was named, was a ride for the Pony Express, he was also a U.S. Marshall. He was present at the laying of the cornerstone of the Salt Lake Temple. He was quite a gentleman. He interested a man called, C.O. Baxter, out of St. Louis, into coming into the Basin and looking at the gilsonite to see if there was any use for it. They formed the St. Louis Gilsonite Company; at that point in time they interested a brewery company in putting up some money for development for idea of lining beer kegs with gilsonite to protect the beer. It turned out that gilsonite wasn't able to do that because it was too brittle.

Most of you have seen gilsonite. This is a very nice specimen. You don't find very large pieces much anymore, the way they mine. This is your Gilsonite, it has (?) fractures like glass, shiny, it's brittle, tends to bevel, it has a thousand different uses. (Question was asked about melting) It melts at temperatures ranging from 300 to 450 to 500 degrees. The melting points of the gilsonite determines the nature of use of the gilsonite. I'm going to pass out a little resume' on gilsonite for you to review and also a brief, one page deal on the Uintah Railway which was built for the sole purpose of bringing gilsonite out of the Basin to the railroad at Fruita. So we are going to talk a little about the railroad also.

One of the interesting things, historically in Utah that started the economic end of this—you all recall the Gusher Strip. Congress drew the Strip in 1888, 7000 acres. The reason for it was that

two of the choice gilsonite veins lay in that area and they wanted to keep it out of the reservation so they could be exploited. The appropriation of bill of 1897 exempts all lands containing gilsonite, asphalt and (?) all land substances and the gilson-asphaltum company battled in court for about twelve years, finally got that decision amended. So the first problems of gilsonite were, what will we do with it and what will we sell it for; what it could be used for, how much does it cost to mine, how much does it cost to haul to markets; because a lot of markets your minerals have no value if the cost of transportation is too high, you can't compete. There is many uses; used in paints, thinners, varnishes, one of the interesting things is, it is used for varnishing horse-drawn carriages. Later uses, as the automobile came in, was the Ford Motor Company, said if you had a car, you could have any color you wanted as long as it was black. The reason it was black was because it was made out of gilsonite varnish—gilsonite paint. Interestingly enough, the old Ford cars had 18 coats of paint on them before they were released for sale to the public. The gilsonite was added to these paints to protect the surface of the car.

So you say what else is it used for in a car today? Well, it is used as rubber products, added to automobile tires, what does it do to automobile tire? It extends the life of the tire keeps it from checking in bad weather, contracting in cold weather, so it has uses there. The battery cases for cars are made out of a combination of rubber and gilsonite. The steering wheels—the old time steering wheel were made from gilsonite, combination. They mixed on the roads—at one time they used it for paving roads but it was too expensive but they did find in later days that mixing a percentage with asphalt-or road oil increased the life of the road and prevented it from having pot-holes. As a matter of fact, the road going down Cocklebur, going down the other side of the hill to the east, Charlie Neal added a 10% gilsonite to that particular stretch and it has never been repaired since other than the time when they redid the road. As a matter of fact, we'll be talking about tar sands here in a little while and I'll tell you a fact about those.

At the turn of the century, in the early 1900s the maximum depth of the gilsonite mine was a 100 feet, was put into 200 pound burlap bags. To lift a 200 pound bag, you have to be pretty stout, why they used a 200 pound bags, I was never able to find out. But they were probably the most convenient for the amount of ore they mined out and hoisted to the surface. The average miner could produce and sack two ton a day, the average miner. He could mine it, sack it, and get it off the surface, two ton a day.

Time wise, a round trip from Fort Duchesne to Price took ten days; at that time they were hauling from Fort Duchesne area, two veins over there. Gilsonite sold in 1903 for \$72.00 to \$100 a ton. The railroad charged \$50 a ton at that point in time. The closest railroad was Denver and Rio Grande at that time the road to Price was to the Denver-Rio Grande.

The Uintah Railway was built for one purpose, to haul gilsonite out of the Basin to the railroad, to the Denver-Rio Grande Railroad at Fruita. 'Course as we know, it turned out it was used for many years. Freight was hauled on it, passengers was hauled on it. They were hauled from the Watson area - Dragon area by stage to Vernal or to Fort Duchesne or Myton or from Myton to Price. It was all part of the railroad operation. The Gilson-asphaltum Company became the ----- Asphalt Company. The Uintah Railway, when it was built as a narrow gauge railroad, 23.8 miles crossed 36 bridges. It ran to 4200 feet up to 8347 feet at Baxter Pass. It was 51 miles from Watson to Vernal, those were toll roads; they paid to use the roads, we got a toll road here after the early 1900s. This was a direct tax for the use of the roads.

The stage coach from Dragon to Vernal took ten hours; 70 miles. They had six Shay engines and 2engines 1 big Baldwin two passenger coaches and they had numerous flat cars to haul in the gilsonite. The train ran three times a week. The railway was never extended

to Bonanza it ended, of course, at Watson. Later, little later it ran up to Rainbow, hauling ore out of Rainbow. A lot of the ore was being shipped to Germany. This is what's really interesting; it cost \$10 a ton to haul it to Price and it cost, from that point, on the Denver-Rio Grande to Germany the total price was another \$13.50. They could haul it from Price to Germany for \$13.50 and \$10.00 from Price. The ore was selling for well \$50.00 - they were paying for it in Germany, they had \$5.00 towards mining and \$20.96 in freight to the port and \$21.66...I was wrong. It was \$21.66 up to the port \$21.00 from the port to Germany.

One of the properties of gilsonite that made it unique it has high resin content, good heat insulation, high electrical resistivity, soluble to alcohol, heavy oils and fats. Its good for water-proofing, good for wear proofing and good for weather-proofing. It makes good floor tile. Tremendous. These new computers use nearly 100% incubated from gilsonite. Especially these high speed printers and laser jet printers. Used for, battery boxes, fiber building boards, sound deadening materials, insulating tapes, 5point insulation. They use it at oil wells as lost circulation materials. They also at one time, if you recall, they made high grade gasoline from it. But what they found, was that the cost of gilsonite, compared to the price gasoline didn't warrant taking gasoline from a very scarce product. Chevron built a refinery over at Fruita for this, but soon they had to quit that because they weren't reaping money from it. But that pipeline, where it was shipped by water storage from Bonanza to Fruita, Colorado is still in use and it was sold as an oil pipeline, transporting oil from the Uintah Basin to the Grand Junction area.

Gilsonite, course is solvent. Normal temperature softens it at 250 degrees up to 500 degrees. So it has a high melt point or what is called a standard. -----

In 1928 they mined 100 thousand tons. 1953 they had a tremendous fire and explosion, probably all remember that. It killed 8 men November 15 1953. But in 1898 over in the Gusher area the St. Louis Mine blew up and blew timbers, I think someone said, seven miles from the mine those timbers were found. It killed two men at that particular time. What they found out, they think, happened there was some men built a fire down in the mine to keep warm and the dust said, no, no, and away it went.

Today's operators in the gilsonite, as I told you, are American Gilsonite, Zeigler and Lexco. The steel rails incidently, were torn out and shipped to Pueblo, Colorado where they were put into a steel mill for steel to be shipped by air to Germany during World War II.

The cost of the Uintah Railways was \$32,000 a mile or a cost all together \$100,750,000 to build that railroad, including the rails, ties and everything. It has been a valuable asset to the Uintah Basin because of the jobs it produced. Produced a continuance of jobs for a great number of people for a great many of years. It has been quite an asset.

Now we come on to another thing that is valiant to the Uintah Basin, that has an early history of mining; that's coal mining. We all know about the Wardle Mine and mines along the face of the mountain. They are called the Frontier Formation which is in age. The Frontier coal beds are relatively thin. The formations are perpendicularly steep, 30 degrees or so which makes mining difficult. Coal was a good coal. In 1893 it sold delivered, \$4.00 a ton, if you went after it yourself it was \$2.00 a ton; December 1893. First published notice on the coal being in the Uintah Basin was a geological survey report in 1877. The earliest mining reported was the George Slaugh mine in 1893. 1903 -1905 the mass production was 10,000 - 13,000 tons a year.

..... production till 1948 when oil became cheaply available from the refinery at Jensen. Also better roads to Price, Utah made coal from Carbon County available and more cheaper. By 1955 only the Wardle Coal Mine was open and they were producing, at that time, a thousand tons year. The veins were four feet thick; so thick, the production was 240 thousand tons.

Then we get to another that has been of some value to the Uintah Basin but not from the stand point of economics an awful lot.--- but created an awful of interest and that was the Dyer Mine. Now we're talking about copper. Copper, with some silver and a little gold.

The Dyer Mine employed approximately 100 people. A hundred people in those days were a lot of people. They shipped 4377 tons during the time it was in operation. High grade ore. It contained \$395 in copper. At Boullionville it had 63 cents in silver. Okay, anyway, they took out \$165,000 in ore and then they spent \$140,000 looking for more, after they ran out of the original ore. The ore was of the Mississippi limestone which was on the mountain front of the Dyer Mine area. There two deposits of ore which was in the copper carbonates, one was directly below the other. Once these two deposits were completed that was all the ore there was.

Harry.... which we all knew, did a report for the mining company up there at the time. He assumed, figured, that there was additional ore in that area that had never been found. Butdid some mapping up there and later they did quite a bit of drilling looking for additional ore but never found it.

Next the ore up there, the largest deposit of iron. Iron being low units per unit per ton, basis literal. The cost of transportation being so high the iron has never been utilized, except for.....

Just down below the copper mine was a series of small mines for mining primarily lead and silver. The biggest of these was the Silver King Mine. In 1892 they formed a carbonated mining district up in that area. It's still there. The district is still recognized as that part of the mining district. There were old time families here in Vernal, Schaefermeyers and others who worked there in that ore.

Recently, what they were doing up there is they were grinding and crushing the ore, the ore that was left, which wasn't very much. They would put in the barrels and they would dump scrap steel in there and sulphuric acid, hydrochloric acid, then they would drop the ore in there and this what came out; it's called matt copper. This came from the Dyer.

After they had the matt copper it was taken to a refinery and was rolled into sheets from then it was purified by oxidant blast furnace and made into a pitch copper product. It all came from the Dyer.

They mined the ore, they were shipping the ore over the mountain to Car....oil from there to the smelters, then later they shipped a little bit of the ore down to Price area. But they did build the smelter at Boullionville. We see pictures of the water jackets where they did smelt the ore right at the mine area.

Question was asked if it was found anywhere else?

Bud: Yes Mainly is found as little pods in various parts of the Mississippi Limestone. Especially along the road up to Steinaker, on up till you get on top of the mountain there. Brush Creek there, is some copper deposits there in the limestone also and several other places in the Basin; nothing commercial.

Question: Any on Dryfork Mountain?

Bud: I don't know of any, but there could be. That is the copper part. It didn't play a very big part in the economics of the Basin but it did have some interesting history with it. There were several fights and one shooting, some brawls.

The second most important mineral we have in the Basin today other than oil and gas from a mining standpoint; is phosphate. We all have been past the phosphate mine, which is now the large mine we see where all the elk they are feeding. So we say, what is phosphate? It was discovered in the Vernal area in 1914. It is a sud..... rock which contains significant

quantities of calcium phosphate. Found mainly in the Park City Formation which overlays the Weber Sand. If you recall the Weber Sand is the producing cooperative (?) formation in Ashley Valley and Rangely. Just north of town the Weber Sand ...? that massive white-looking salescoat(?) that you see when you start right up the dugway and get almost past Windy Point there you can see the massive sandstone on either side, Weber Sand. You can also see it in the cut as you round that sharp corner, this is the phosphate member of the Park City Formation.

The phosphate of course is used for many different things. But primarily it is a fertilizer. It can be made into super- triple phosphate which is 51% pt 05. It twenty to forty feet thick in the Vernal area. It is mined in the soft slope of the Uintah Mountains with elevation 7000 to 8000 feet. It is mined by open-pit mining. Over burden is stripped,they can strip it with big dozers.

The man locally credited it with discovering the significance of the deposits was Harry Ratliff. He located 136 claims of 160 acres each between Brush Creek and Little Brush Creek. This was in 1915. Just prior to that they patented 91 claims containing 18,000 acres. The economics of open-pit strip mining, this particular phosphate deposit is what they call a low grade deposit, it has it's advantage of being strip mineable, which means low cost of mining, which makes it meaningful from the standpoint of making money with it.

If you recall, they were hauling phosphate up until about ten years ago, they were hauling phosphate to Foston which was just outside of Park City. You remember those big buildings that were there. What were they doing with there? They would take an haul that material to the smelter at Garfield; where they were in the process of refining it, they manufactured in the process of sulfuric acid.

Well now we knowphosphate in a large slurry up over the Uinta Mountains and into Rock Springs. Just outside of Rock Springs is a plant where they take sulfuric acid, which piped all the way from produced by Exxon from the gas well and extracts the sulphur out of it and mix a little water with it and makes it appear gasoline. Practice

Used to go to Foston and to Garfield for the acid treatment they beneficiated a little here....was trucked to 200 miles to Garfield for processing into phosphoric acid, ammonia, super, triple phosphate. Major uses is for agriculture fertilizer; is the primary use; also in the processes they make hydrochloric acid as a by-product. Hydrochloric acid is used in the steel industry and chemical industry. To make the phosphate they add other things. They add potash which they mine down in the Moab area by solution mining, underground and nitrogen; makes commercial fertilizer. By the time they add different elements, each ton of phosphate produces one ton of gypsum. Gypsum is a by-product in the process. So they get a lot of different things; hydrochloric acid, potash, gypsum. Gypsum could be used for wall board or plaster or whatever.

What is phosphate for? Why is it there in the mountain for us? It was laid down in the bottom of the ocean. When the ocean was there. The ocean covered this area all the way from Texas, all the way up to Canada and Alaska. This was low lying area, there were no mountains at that time, it was a big trough, extending all the way from eastern Colorado to the Wasatch Front area. The Wasatch Mountains weren't there either at that time. It was an inland waterway marine; where did phosphate come from to begin with? It came from (indian ?) rocks which were weathered out; solutions, from rain and grinding of pebbles in streams that put it in a solution carried it down to the ocean. The ocean was precipitated and dropped it to the bottom of the ocean as phosphate ooze. So we say where is the biggest phosphate deposits in the world? There are four of them. Does it make sense? Cause those lands down in Florida were under

water and now they are elevated just above water maybe not more than 10 or 20 feet above water. Those phosphate beds were raised from the depths to above water and they have big strip mining fields down there. The United States supplies one third of the phosphate in the world. Here, we have a deposit no where near as big but is very beneficial to the companies that operate it and the people in Utah, because of the jobs to the people in the Basin. So there is the phosphate.

The phosphate.....washing of the soil, the plants are absorbed, what happens to the plants? They are eaten by animals, the animals absorb by eating the plants, the excrement and bone is high in phosphate that is dissolved again and carried down in the waters and runs out into the ocean. The precipitating on the ocean floor and being mined and the whole process starts all over again.

In the year of 1984 San Francisco Chemical was producing 180,000 tons a year shipping to Foston, then Stauffer, then in July of 1993 the operation up there employed a 100 people. Production in 1986 was two million tons concentrate. That was Chevron Resources. We can see Chevron Resources have taken good care of the environment. Up near the highway there is no gouges in the land or anything, they have left 2 millions tons of phosphate there so as not to disturb the ecological beauty of that area. They have taken care to produce good results by seeding the land that has been reclaimed and taking of the elk and the deer. As you drive by there, you see nothing that looks bad there at all, all looks nicely done. They've done a tremendous job on the conservation.

What is another that has created a lot of interest in the Uintah Basin and really run high for a while, put a lot of money into a boom and bust—oil shale. What happened to oil shale? Well it had an early start in the history of the Uintah Basin. What is oil shale? Oil shale is a shale which is high in organic material. Rich in organic material and is capable of yielding up to 15 gallons or more of oil per ton when the shale is heated and retorted. There is no oil in oil shale. It is rich in organic material called carrageen. What is carrageen? Carrageen is composed of plants, insects, pollen, spores, things involved in a fresh water lake. This was a(?) lake which extended all the way from Wyoming all the way down to the Ephraim area and into Colorado into the Peance Basin area. This big lake was called (Nakey Wood ?) Shortly thereafter, the lake in Wyoming was separated from this lake, but at one time they were all one lake.

This was a fairly warm water lake, this particular time the climate was humid, to warm, there were warm winters, but probably not great. The surprising thing about the oil shale as you look at it, is that it is like rings in a tree, you can tell the number of years it took to deposit the particular amount of shale by counting the rings only we don't count the rings we count the bar What time of year would be the most? When would the most organic material be laid down, summer or winter? Summer. Here what we look at.

See the banding, dark band, light band that's one year. This shale from a hole we cored for an oil shale company when everybody was hot on oil shale. This is fairly rich shale. This would yield about 30 gallons of oil per ton. By grinding, crushing, retorting it and converting the carrageen into oil. Sometimes when it's weathered, it weathers dark blue to white blue.

Dark brown, dense, very fine grain was laminated, this composes from 50 to 70 % inorganic matter which is dolomite, cal....and clay. When it is heated to 400 degrees or above you're getting matter passes off as a gas which, when condensed is recovered as a bisques, liquid petroleum. This petroleum is black, waxy. Room temperature is soft and mushy.

The oil shale deposits a fresh water in ancient Lake Uinta as a quiet organisms, waxy spores, pollen, grains, algae, insects, larvae, were deposited as a black ooze in the bottom of the lake. Then it changed to gelatine-like ooze and was compacted and liquefied into this solid rock. The formation which contains the oil shale is known as the Green River formation. And particular

member which is found is called the Parachute Creek Member. It is named for Parachute Creek, Colorado. That's the best zone which oil shale occurs.

In 1896 the U.S.G.S report on gilsonite stated, the bituminous shale might be of commercial value under favorable circumstances. Thus started the big filing of classer (?) oil shale mining claims. According to the government you could file with what was called oil.... . mining claims. There were thousands of these oilmining claims all the way from Peance Basin in Colorado, all the way over to Duchesne. Because of the excitement of mining this oil right and driving depression related to oil - seemed everyone agreed tremendous. Economics were never quite there. But for years the prospectors and the old timers and probably a lot of your families would go out there and mine and do the assessments work. A hundred dollars of work for a year, kept the claim valid. Then in 1915 they withdrew all the oil shale from mining, from any further location. No, in 1921, they withdrew oil shale and tar sands and gilsonite from any further location by mining claims.

After World One experimental mining recovery operations were conducted by private companies. In 1916 a 132 square miles in southwestern Uintah County was withdrawn. During 1921 all BLM lands were withdrawn from location. Well, these prospectors went on and a lot of them tried to process the ore, tried to make commercial gasoline out of it, which was the idea, oil and gasoline. None of them succeeded. How many of you have been down to old oil shale plant on the White River below Bonanza? It's still there. I was going to bring a brick from there, it was made over by Gunnison, Colorado. There is another one down between Willow Creek and Hill Creek. That particular oil shale plant is still there.

Many people tried to extract oil shale from it, the process was never considered successful, then in 1944, the Bureau of Mines had been experimenting and they came up with a process that they figured would be economical vital. And that set off a thing when people coming and acquiring some of the old claims that were here from your ancestors and relative and putting blocks together of these little classer claims and trying to bring a patten.

Well, out goes the work for the patent they fought in the courts for years. The last few years the decisions have been to grant most of the ones who had done their assessment work properly and the price, I think, for the per acre--- for the claim was \$5.00 an acre. The President of the United States said how come they can buy these claims for \$5.00 an acre for the patent? Well, they don't realize their relatives and families have been working and paying a \$100 on these claims for years and have never gotten anything from it. That is essentially one of the things that's going to happen in the near future. So those patents will be granted, it appears.

In 1944 working with the government on their processes, were Union Oil, Sinclair, Sun Oil and many others. The Bureau of Mines went up to Rifle, Colorado, up in the hill was where there mine was. They were mining underground in rooms that were 60 by 60 feet with 60 foot pillars, they didn't have to any propping or anything because the shale reached . They had taken to mining the shale with heavy equipment. Bringing it to the surface, grinding, crushing, heating it to vertical retards then they tried horizontal, then they tried everything. At that particular time, the thing that kept the oil shale business in the Uintah Basin and in Colorado going was the government subsidies. There wasn't a company at that particular time that could tell how much

it cost to produce a gallon of oil. They had no handle on their cost at all, what so ever. It's sort of like when you get into government subsidies and things and you suddenly take it away and people don't know how to exist, they haven't been used to competition. When they took the subsidies away from the oil shale business, that was the end of it. White River oil shale project out here which is a big hole in the ground today, with all the buildings out there, they tried to find a buyer for it; it sits there as a monument to the fact, that it wasn't economical viable.

Anyway, they were mining this underground by this high rooms and pillars and they were not making any money but they were getting close to cracking the technology.

The best oil shale is not in Utah but in the Peance Basin, in Rio Blanco County, Garfield County, in Colorado. We do have good mineable shale here which has good commercial value. And in the future, someday down the line, this shale will come to pass, as the price of oil increased and oil decreased in quantity from various countries; the price of oil will probably go up to where it will be economical viable.

It is very interesting to see that there has been recent talk in the last issue of the Vernal Express and I've heard the commissioners talk about it; about a railroad in Vernal. Why would they want a railroad in Vernal? What is there here? Some of these things I've been about are here. Phosphate is here, oil shale is here, gilsonite is here, tar sands are here. We have timber, we have cattle to ship, there is a lot of things that can be shipped on the railroad much cheaper than they can haul. But is it is viable to build a railroad in this day and age.....?

Anyway oil shale is another thing that has prospect for the Basin. We have discussed three of the most important, phosphate, coal, tar sands and the gilsonite.

Lets talk about gold. Everyone thinks gold is rare. Gold is not rare. It is only rare in economic quantities; where it can be mined economically. Most operations that mine for gold never see the gold at all. It is usually so finely divided into rock that you never see it.. Occasionally there is exceptions, of course. When I was in the Colorado School of Mines, they had some big nuggets from the Colorado area, Ouray and other areas but these were the exceptions.

Let me mention a few things about the tar sands. We have been fortunate in Vernal to have all the roads and street paved with the tar sands. In Denver, one time they decided they wanted to try the material to patch the holes, to see if they wanted to buy any or not. So the sent a load over there and they patched a bunch of pot holes in Denver and of course, what happened the material made from crude oil washed away and wore away and left the Vernal material there and in Denver, they call them the Vernal Bumps. That's a truism. It makes an excellent road material.

But we have the gilsonite, phosphate, coal, oil shale, bituminous sands, copper, which amounted something. Silver and lead which amounted to little. The gold—there have been some money operations on the river. Hiko Bell had some properties on the river and turned out not to be viable. Problems are, presently, extracting the gold, 75% of the gold goes off in the water. The gold is so fine; it is called flower gold, it floats. If you have ever noticed the river waters are kind of greasy, that's from the sap and resins, waxes from the trees and organic material, makes it kind of greasy. The gold is very fine and it floats like a little boat. The little gold particle are almost shaped like a boat. The heavy material can be recovered by normal recovery, by floatation, by gravity separation. But the prime gold goes off in the water. Where as they can go down the river today an and make a little money with a big money venture. The profit goes off in the water. So the secret lies how can that be remedied? There is several new techniques that have been adopted by the Bureau of Mines that can recovery this gold.

The Bureau of Mines process which they are using in Nevada can be adapted to this country. It has not been. It amazes me, I could never figure this out. Mining companies are not like oil companies, they don't work like oil companies. Mining companies look at for a year and they sample it for a year, they'll revalue it for a year, they take a few risks, maybe four or five years later they get around to actually doing their pilot study another five years if everything goes good they are in the process of mining. That is 10, 12 years down the line if everything works out accordingly.

It is possible that in the future, it may be viable to economically mine the gravels in the Green River. If you can get the other 75% of the gold that is in those gravels, it will be a viable thing which will change the face of the operations on the River. There is something that will have value in the future.